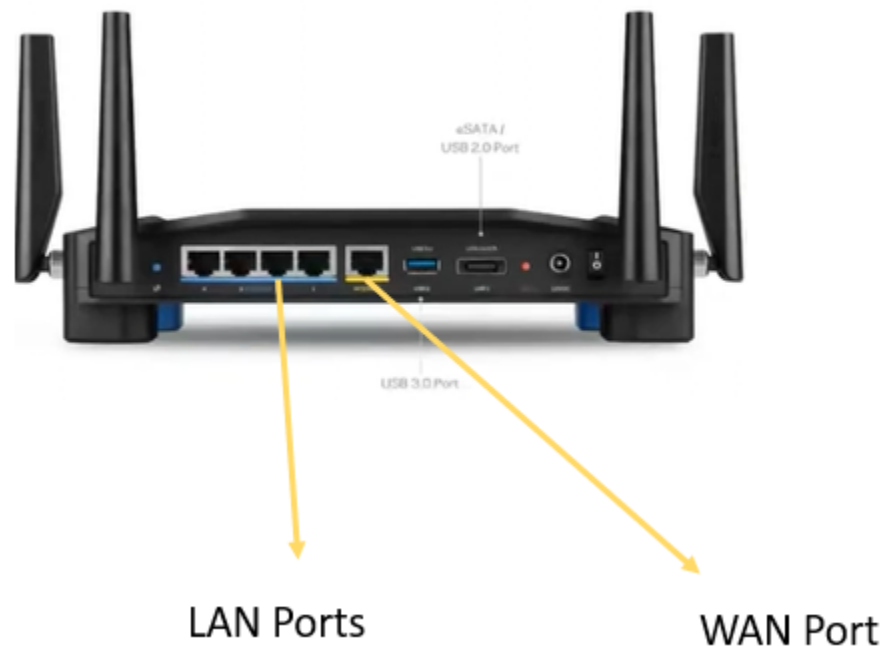


Answers for Session 1d- Basic Functional Building Blocks of a Wi-Fi AP/Router

1. What is the significance of the color for ports on the Router(Blue and Yellow) ?

Different colors are used to visually differentiate between WAN and LAN ports



2. What is the difference between residential Gateway and modem?

A modem is a device that connects your home network to the internet. It does this by translating the signals from your internet service provider (ISP) into a format that your devices can understand. Modems can be either wired or wireless, and they are typically provided by your ISP.

A residential gateway is a device that combines the functionality of a modem and a router. A router is a device that creates a local area network (LAN) and allows multiple devices to connect to the internet through a single connection

3. Is there any default time for lease period in DHCP?

Yes, there is a default time for lease period in DHCP. The default lease time is 24 hours. This means that a device will automatically renew its IP address every 24 hours, unless it is turned off or goes into sleep mode.

However, the lease time can be changed by the DHCP server administrator. For example, a lease time of 1 hour might be appropriate for a public Wi-Fi network, where users are constantly connecting and disconnecting. A lease time of 1 week or more might be appropriate for a corporate network, where devices are typically left on for long periods of time.

4. what will happen when the lease time is completed but the user is still using the IP address?

After the DHCP client has obtained a lease, there is no further communication between the client and the server until the lease expires or the client releases the lease (client release if it shutdowns/ goes out of the network).

Lease: A lease is a period of time during which a DHCP client is assigned a particular IP address. At the end of the lease period, the client must renew the lease or release the IP address.

If the client is connected, the lease time will affect the client in the following ways:

- The client will automatically renew the lease by sending a DHCP Request message to the server, unless it is turned off or goes into sleep mode.
[The DHCP request is sent with the the IP address it previously got]
- If the client does not renew its lease before it expires, the DHCP server will reclaim the IP address and make it available to other devices on the network.
- The client will experience a disruption in its network connectivity if its lease expires and it is unable to obtain a new IP address.

Let's assume a lease time of 10 minutes. If the client sends a DHCP Request to the server at the 10-minute mark, it needs to wait for an acknowledgment before it can use the IP address. But what if the Request message doesn't reach the DHCP server,

perhaps it got dropped? And what if the acknowledgment from the server doesn't reach the client? In such cases, there's a risk involved.

The concept of preparing some time in advance before any event has been instilled in us since childhood, and it remains true today – the earlier, the better.

The client typically sends the DHCP Request when half (50%) of the lease time has elapsed. If it receives the acknowledgment, it retains the IP address.

But what if the request packet does not reach the DHCP Server? What if there is no acknowledgement from the server ?

In this scenario, the client increases the frequency of its DHCP requests to the server.

When approximately 90% of the lease time has passed, the client broadcasts another DHCP request.

At the end of the DHCP lease time, if there has been no confirmation from the server, the client loses its IP address and sends a DHCP discover message.

The primary purpose of having a lease time from the DHCP server's perspective is to reclaim and recycle IP addresses if the client is no longer active on the network, meaning it's not sending DHCP Requests. This procedure serves as a mechanism to verify the client's presence on the network; if it doesn't actively request an IP address, the server may reclaim that IP and make it accessible for other devices to utilize.

This behavior can be understood from the pcap shown below.

No.	Time	Source	Destination	Info
	1 2023-10-09 14:05:20.821044	0.0.0.0	255.255.255.255	DHCP Discover - Transaction ID 0x10482495
	2 2023-10-09 14:05:20.821132	172.16.0.1	172.16.0.136	DHCP Offer - Transaction ID 0x10482495
	3 2023-10-09 14:05:20.835925	0.0.0.0	255.255.255.255	DHCP Request - Transaction ID 0x10482495
After 50% of time	4 2023-10-09 14:05:20.837874	172.16.0.1	172.16.0.136	DHCP ACK - Transaction ID 0x10482495
	5 2023-10-09 14:10:21.848654	172.16.0.136	172.16.0.1	DHCP Request - Transaction ID 0xfe5daf0
	6 2023-10-09 14:10:25.403255	172.16.0.136	172.16.0.1	DHCP Request - Transaction ID 0xfe5daf0
	7 2023-10-09 14:10:38.785143	172.16.0.136	172.16.0.1	DHCP Request - Transaction ID 0xfe5daf0
After 87 % of time	8 2023-10-09 14:11:27.825170	172.16.0.136	172.16.0.1	DHCP Request - Transaction ID 0xfe5daf0
	9 2023-10-09 14:14:07.853655	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
	10 2023-10-09 14:14:09.254747	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
	11 2023-10-09 14:14:11.744426	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
	12 2023-10-09 14:14:16.110274	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
	13 2023-10-09 14:14:24.053382	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
	14 2023-10-09 14:14:39.890904	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
After 100 % of time	15 2023-10-09 14:15:16.851359	172.16.0.136	255.255.255.255	DHCP Request - Transaction ID 0x37dfe19e
	16 2023-10-09 14:15:21.545060	0.0.0.0	255.255.255.255	DHCP Discover - Transaction ID 0x1b3b800e
	17 2023-10-09 14:15:22.611269	0.0.0.0	255.255.255.255	DHCP Discover - Transaction ID 0x1b3b800e
	18 2023-10-09 14:15:24.588597	0.0.0.0	255.255.255.255	DHCP Discover - Transaction ID 0x1b3b800e
	19 2023-10-09 14:15:28.265802	0.0.0.0	255.255.255.255	DHCP Discover - Transaction ID 0x1b3b800e

5. What is DDR?

DDR (double data rate) is a type of memory technology that transfers data on both the rising and falling edges of the clock signal, allowing for faster data transfer rates. It is used in a variety of devices, including computers, laptops, smartphones, and tablets.

DDR offers a number of benefits:

faster performance

Lower power consumption

increased memory density

Now a days L DDR (Low-power double data rate) is being used which is more efficient

Example: DDR SDRAM

6. what is the difficulty in usage of routers in place of APS

you have multiple routers on a network, each with its own DHCP server, then the clients connected to each router will be in different networks. This can make it difficult to manage the network, because you will need to keep track of the IP addresses that have been assigned to each client, and you will need to configure firewall rules and other security measures to allow communication between the different networks.

Access points are layer 2 devices, which means that they cannot route packets between different networks. This means that if you have multiple access points on a network, then all of the clients connected to those access points will be on the same network. This can make it easier to manage the network, because you will not need to worry about routing packets between different networks.

Access points are a good option for extending the range of a wireless network, but they should not be used to replace routers.